

DEMETDENT Sintering Furnace

Instruction Manual

Catalogue

I. Overview.....	1
II. Technical Parameters.....	1
III. Packing Configuration Checklist	2
IV. Warning	3
V. Equipment Structure Description.....	4
VI. Device Installation.....	4
VII. Power On.....	5
VIII. Equipment Operation.....	6
IX. Heating Element Replacement.....	12
X. Maintenance Precautions.....	13

I. Overview

Thank you for purchasing and using our products, Zirconia Sintering Furnace using ergonomic design, novel, rational structure. This furnace is manufactured by modern machinery manufacturing and processing equipment with exquisite workmanship and high quality. High temperature chamber using high purity alumina lightweight fiber materials, excellent thermal insulation properties, without pollution. Control interface is large-size high-definition true 7 "TFT color touch screen, good graphic display, easy operation. Advanced PID intelligent temperature control, high temperature control precision, reliable work. The whole process of fast sinter time is 2 hours (including heating, heat preservation, and cooling), and sinter 80 units at a time. Conventional sintering sinter 120 units with 3 layers of crucibles.

Please read this instruction manual carefully before using the product.

II. Technical Parameters

Fast sinter : 2 hours (80 units)

Conventional sinter: 3-layer crucible, 120 units

Temperature accuracy: ± 1 °C

Touch Screen Size: 7 "TFT

Rated power: 3KW

Voltage: 220V 50Hz/60Hz

Programs : 40

Number of silicon molybdenum rods: 4

Sensor Type: Double platinum rhodium

Maximum temperature: 1730 °C

Operating temperature: less than 1650 °C

Heating rate: ≤ 40 / min

Hearth size: $\varnothing 110\text{mm} \times 120\text{mm}$

Dimensions: Length 460 \times depth 590 \times height 850mm

Weight: 85KG

III. Packing Configuration Checklist

No.	Product Name	Reference Diagram	Unit	Quantity
1	Sintering Furnace		set	1
2	Crucible		pair	3
3	Zirconia Beads		bottle	1
4	Sinter Base		piece	1
5	Spare Heating Rod		piece	1
6	Corundum tube		piece	1
7	Corundum tube base		piece	1
8	Instruction Manual		piece	1
9	Air Switch		piece	1
10	Multimeter		piece	1
11	Repair kit		piece	1

IV.Warning

1. Do not disassemble, repair or modify any part of the machine without prior approval from an authorized technician. It could be out of warranty and could cause damage, electric shock or fire.
2. Ensure the oven is properly grounded to prohibit error or electrical hazard.
3. Do not cut or modify the power cord. Do not stretch or bend the power cord that may cause electrical hazard.
4. Keep flammable materials away from the oven at all time.
5. Keep liquid away from the oven and avoid using the oven in damp environment to prevent electrical hazard.
6. Ensure that the power plug is firmly plugged into the proper section. Unstable contact may cause a electric spark and a fire.
7. Always wear heavy thermal insulated gloves when handling units with door open to avoid burns.
8. Always ensure that the oven is completely stopped before working with the oven and only operate the door when the machine is not in a cycle.
9. Do not touch or handing the power plug. It may cause a electric shock or a fire.
10. Carefully use tongs without touching wires when takeout Crucible from inside of chamber.
11. Do not place flammable materials or body inside of Furnace. It may cause a burn or a fire.

V. Equipment Structure Description



①: Sintering Furnace ②: the Bottom Tray ③: Touch Screen Control Panel

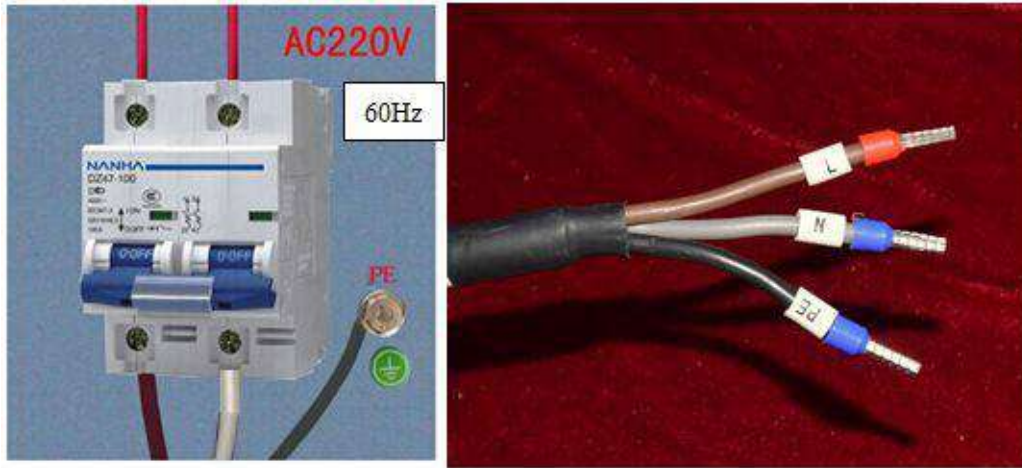
VI. Device Installation

1. Installation hints:

- ※ Open packing boxes, check if all the equipment are intact, and if the random parts are complete according to the packing list.
- ※ Place the furnace on the dry, ventilated, dust-free platform, keep a distance from other objects around not less than 25cm, so that the device can work properly under good ventilation and cooling conditions.
- ※ Should take notice of the device heat resisting property around the furnace, the device will release heat in the surrounding environment, and its calorific value are within the safe range, but does not exclude the heat radiation in long-term use may cause the around device color fading due to close proximity.
- ※ Forbid placing inflammable and explosives around the furnace.

2. Open the furnace upper cover, remove the cushioning foam pad protecting heating rod. Then visually inspect if heating element damaged during transportation, if no damage, fix the screws on the furnace cover. Remove the filler in the chamber.

3. Pay attention to the power supply logo when install the power cable, be sure not to import non-confirming supply voltage to avoid control system damage. Please turn off the power if not use. The wiring mode please see below:



Note: This device is a large current equipment, with high requirements for the joint processing of power lines. Need compress the end of the power line directly and connect it to the wire holder of the air circuit breaker, and screw the bolt. Ensure to compress the power line end, no loose, otherwise will lead to accident or danger due to the heating caused by too large resistance at the thread juncture.

VII. Power On

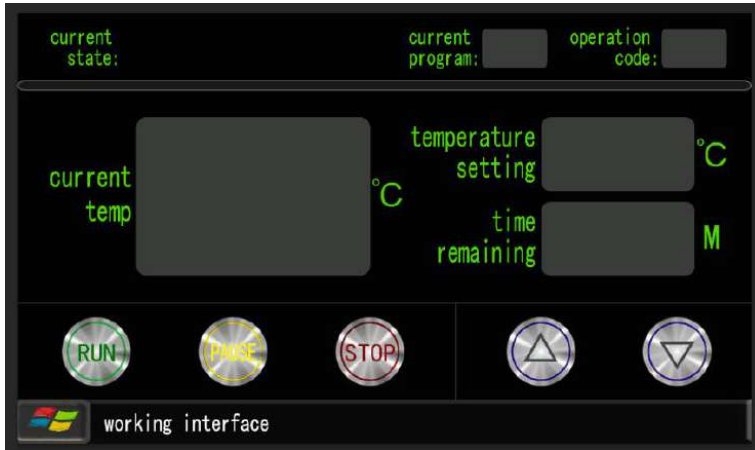
A※ Air switch at closed furnace back;




B※ Touch screen displays the initial interface as follows:




After initialization, enter the main interface:



C※ Press button  on touch screen, decrease the lift down to the lowest position, remove the packing cushion from the hearth; and clear the dust particles on the lifting platform with vacuum cleaner.

C ※ Place the furnace base on the working table(don't place any other articles around the lifting tray to avoid hindering the operation when the tray rise and fall causing

equipment malfunction). First time use, press the “rise key”  and the “fall key”

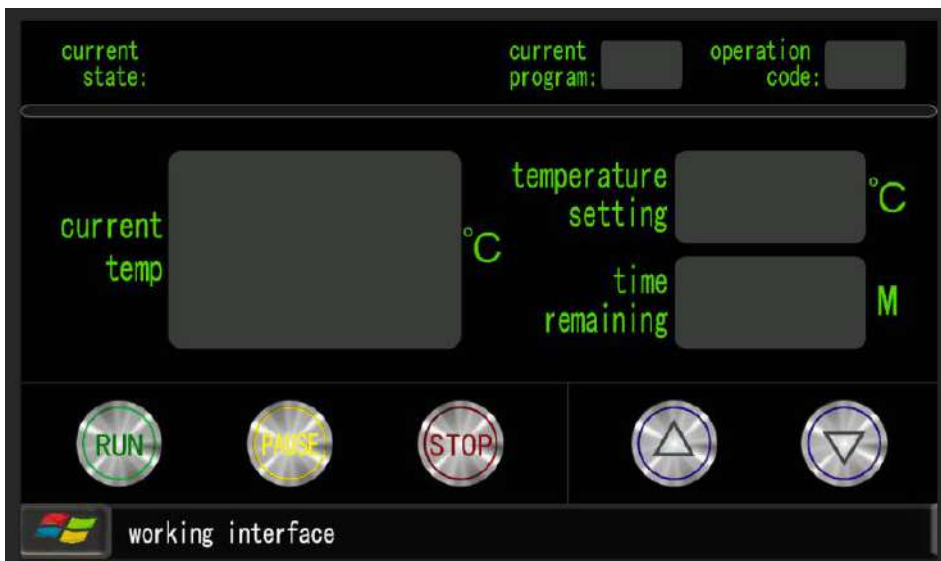
, observe whether the alignment of the furnace base and hearth bottom, and keep no rub when furnace base in and out of the hearth.

VIII. Equipment Operation

Welcome

A※ Main interface, is work interface.

Machine power on, the screen appears initialization interface , after the initialization, automatically enter the main interface, as shown below:



among them:



Program run key. Press this button, the current program will run.



Pause key. Press this key in running state, the program will be in a suspended state, the temperature remains constant.



Stop key. Press this button under operating state or suspended state, the program will end.



Tray rise key. Press this key, the tray will rise, press again, the tray will stop.



Tray fall key. Press the key, the tray will fall, press again, the tray will stop.

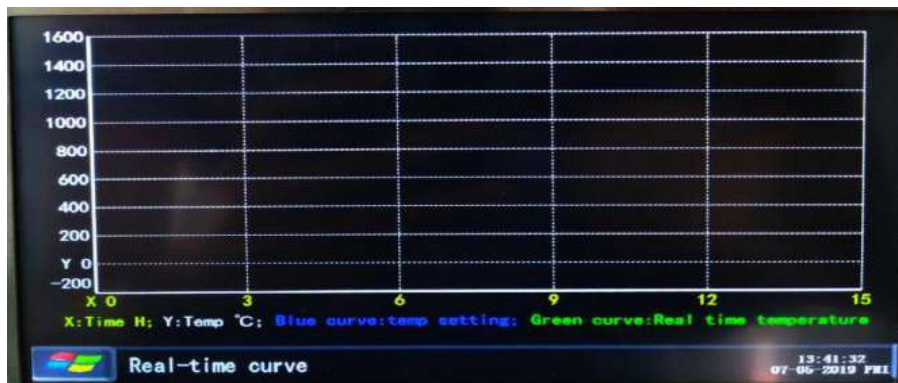
Note: When the furnace temperature is above 300 degrees, propose to ban starting hearth, because there is large temperature difference between hearth inside and outside, too much cold shock could cause heaters and furnace insulation materials damage, then press DOWN key, there will be a warning statement appears in the status bar below the screen.



Menu key. Press this button, pull-down menu appears, as shown below:



B※ Real-time curve interface, as shown below



C ※ Program editing interface, as shown below



This interface, you can edit the program. Total of 40 groups of programs can be edited and saved by selecting a different program number, each group of program can be edited. Wherein C represents temperature, T represents time. After editing, press “store” key to save.

D ※ parameter setting interface. There are important arguments, we do not recommend frequent changes, incorrect modify of some parameters may cause thermal runaway, and even damage to the machine. Therefore, needs authorized password to modify the parameters.

- Program Setup Instructions

C represents temperature, T represents the time

Note: Temperature 1, time 1 and other parameters can be modified directly by the display position on the touch screen. Temperature 1: used to fill the "starting point temperature value" is usually set to 0 °C

Time 1: Run time of the first block, setting range: 0 to 9999 minutes;

Temperature 2: End of the first block. Starting temperature is also the start point of the second running stage. If the temperature values C1-> C2 as temperature rising program, typically C2 setting range is recommended as $(C2 - C1) / \text{Time1} \leq 10 \text{ } ^\circ\text{C} / \text{min}$.

Time 2: The program running time of the second paragraph, setting range: 0 to 9999 minutes;

Temperature 3: End temperature value for the second running program, it's also the starting temperature point of the third paragraph running programs, if C2-> C3 for the temperature drop process, usually the setting range of C3 is recommended as: $(C2 - C3) / \text{Time2} \leq 30 \text{ } ^\circ\text{C} / \text{min}$.

Time 3: Running time of the third paragraph, setting range: 0 to 9999 minutes; other "temperature - time" parameter of temperature ranges is set according to the method described above.

Last time: "-121" indicates the end of program, temperature controller runs by "Temperature Time" parameter setting, when the program detects a "-121", the control program will be executed "STOP command" to return to the first program segment, -121 corresponds to a single set of sintering curve set well.

Note: Program No. 1 stored on the machine is suitable for 95% zirconium blocks on the market.

- Stored sintering curve

No.1 Sintering Curve (1--3unit bridge)			No.2 Sintering Curve (4--5unit bridge)		
temperature segment	temperature	time	temperature segment	temperature	time
1	C1: 0	Time1: 30	1	C1: 0	Time1: 30
2	C2: 300	Time2: 30	2	C2: 300	Time2: 60
3	C3: 1000	Time3: 120	3	C3: 1000	Time3: 180
4	C4: 1480	Time4: 60	4	C4: 1480	Time4: 90
5	C5: 1480	Time5: 60	5	C5: 1480	Time5: 60
6	C6: 800	Time6:-121	6	C6: 800	Time6: -121
No.3 Sintering Curve (6—8unit bridge)			No.4 Sintering Curve (9 unit bridge and above)		
temperature segment	temperature	time	temperature segment	temperature	time
1	C1: 0	Time1: 30	1	C1: 0	Time1: 30
2	C2: 300	Time2: 60	2	C2: 300	Time2: 90
3	C3: 1000	Time3: 240	3	C3: 1000	Time3: 360
4	C4: 1480	Time4: 90	4	C4: 1480	Time4: 90
5	C5: 1480	Time5: 90	5	C5: 1480	Time5: 90
6	C6: 800	Time6:-121	6	C6: 800	Time6: -121

Below take UPCERA zirconia block record sintering curve as an example:



1.0°C ~300 °C	10°C/min	need 30min
2.300°C~1000°C	17.5°C/min	need 40min
3.1000°C~1480°C	4.83°C/min	need 100min
4.1480°C	keep	120min
5.1480°C~800°C	13°C/min	need 52min
6.natural cooling		

Setting as:

temperature 1: 0°C
time 1:30min
temperature 1: 300°C
time 2:40min
temperature 3: 1000°C
time 3:100min
temperature 4: 1480°C
time 4:120min
temperature 5: 1480°C
time 5:52min
temperature 6: 800°C
time 6: -121

Notes:

[A] For the first time or after a long time use, need to bake about one hour at 120 °C, and bake about two hours at 300 °C, so as to avoid furnace hearth cracking. Furnace temperature shall not exceed the rated temperature, so as not to damage the heating element and the interior of chamber.

[B] After the program finished running, it will automatically come to a standstill state. When the temperature is below 200 °C, can close the furnace back breaker.

[C] When the equipment is idle, should keep the lift station to the top, to ensure oven cavity be dry.

[D] Although this device design based on human security perspective, but incorrect use of equipment may still cause damage. Do not allow users to modify the equipment without permission. Prohibit placing toxic, hazardous chemical products and high-contaminated items into the cavity, otherwise it may cause harm. Under continuous rising working temperature, furnace surface local temperature may reach above 70 °C, do not directly touch the furnace with the body surface, so as not to cause harm. Please turn off the power when clean furnace, do not use any cleaning agents and flammable liquids to clean it, wipe it with a damp towel. Do not use sharp objects to click unit control display screen, avoid screen damage and body harm. Regularly use screen cleaner to clean the display unit control, this cleaning agent will not produce any scratches and can prevent the generation of static electricity. For the damage caused by improper operation of using and cleaning the display, it is not included in the warranty. The system is equipped with exhaust fan, which is used to control the temperature of the system to ensure the safety of the system, do not block the furnace cover.

[E](1)The crucible should be placed in the center of the base brick and in the right center place to avoid damage to the chamber in the process of pallet lifting.

(2)Click "Run" and the tray will rise and then the tray will drop, that is normal. Six minutes later, the tray will rise again (the tray will rise to half of its position), and when the temperature reaches 500 degrees Celsius, the tray will rise to complete closure.

(3)After clicking "Run", please do not touch the screen again to avoid terminating the program manually

(4)Avoid sintering objects with harmful volatile substances to avoid polluting the chamber;

(5)Clean the machine shell and touch screen regularly;

(6)Regularly check whether the fixing screws of the heating rod are loose every two weeks;

IV. Heating Element Replacement



A. OPEN THE TOP COVER



B. UNSCREW THE COLLET
SCREW THAT NEEDS TO
BE REPLACED



C. REMOVE THE
CONNECTING
ALUMINUM BRAID



F. REMOVE THE HEATING
ELEMENT THAT NEEDS TO
BE REPIACED



E. REMOVE THE ALUMINA
SPACER



D. REMOVE THE
FIXED PORCELAIN
CLAMP SCREW



G: replace the new heating rod, invert step E,D,C,B,A: put in the alumina spacer block, screw on the porcelain block fixing clip, cover and tighten the aluminum woven bag, install the cover plate, and complete the change.

Note: the heating rod is fragile, handle it lightly. When the porcelain block is screwed on to fix the clamp, lift 5mm on the silicon molybdenum rod so that the silicon molybdenum rod does not touch the bottom plate in the furnace to prevent the thermal deformation of the heating rod element. In case of any indiscretion, please contact us.

X. Maintenance Precautions

[A] Under high temperature firing process, do not open the furnace. Because this is not only dangerous, but also the heating element is easily bending deformation, the furnace is also easy to crack, causing damage.

[B] After firing completed, make sure the furnace temperature is below 300 °C, if it's above 300 °C, do not cut off the power supply, thus will cause the cooling fan to stop working, the surface temperature of the furnace may swells, damage furnace body.

[C] For the first time or after a long time not use, should bake the furnace one hour at around 120 °C , brake 2 hours at about 300 °C, so as to avoid furnace cracking. Furnace temperature shall not exceed the rated temperature, so as not to damage the heating element and the brasque. Prohibit directly pouring various liquids and dissolved metal into the furnace, keep furnace clean.

[D] If using silicon-molybdenum rod furnace as heating elements, based on the physical properties of silicon molybdenum rods, very brittle at room temperature, therefore can not freely disassemble and move the furnace after the heating element is installed.

[E] When use the cold stove, because the furnace is cold, should absorb a lot of heat, so the heating rate should not be too fast at low-temperature segment, the heating rate difference of each segment should not too big. Should take full account of the sintered material physical and chemical properties when set the heating rate to avoid the spray material phenomenon and hearth pollution.

[F] Periodically check the connection of the electrical contact portion of the temperature control system is good, special attention should be taken for the connections of heating element connecting point are tight.

[G] Silicon molybdenum rods as heating element, should not run for a long time at temperature ranges 400-700°C, otherwise silicon molybdenum rod will occur low-temperature oxidation.

[H] If silicon carbide rods as heating elements, the resistance will gradually increase after long-time running, this phenomenon is called "aging." Stove after running for some time, the aging of silicon carbide can cause the heating rate and the desired temperature can not reach the original value. If the element is damaged much or resistance growing too large, can not achieve the required temperature, it's better to replace with new element.

[I] The furnace applies to the following operating conditions:

- 1) ambient temperature between -10~75°C;
- 2) the relative humidity of the surrounding environment does not exceed 85%;
- 3) no conductive dust, explosive gas and corrosive gas which seriously damage the metal and insulated material around the stove;

4) there is no obvious tilt, vibration and bumps.

[J] Users are in compliance with the storage, use, installation and transportation regulations, from the date of delivery within 12 months, unable to work due to product quality problems, our company will provide users with the whole free services (except artificial damage). After the warranty expires, we will continue to make the paid lifetime maintenance according to user's requirements. Heating element belongs to consumable parts, it's beyond the warranty scope.

Shandong Carved Intelligent Technology Group Co., Ltd

Note: Our products must be used in accordance with the instructions for use. We accept no liability for any damage resulting from incorrect handling or usage. The user is furthermore obliged to check the product before use with regard to its suitability for the intended area of applications. We cannot accept any liability if the product is used in conjunction with materials and equipment from other manufacturers that are not compatible or not authorized for use with our product.